

**REMARKS FOR ADMINISTRATOR BOLDEN**  
**GEORGIA TECH SPACE SHUTTLE SYMPOSIUM**

**June 7, 2011**

Thank you for inviting me to join you today for one of what I hope will be many forums around the country that discuss the legacy of the Space Shuttle Program and help build on its achievements as we move into the next generation of human spaceflight.

It's good to be here at Georgia Tech, home of our NASA Chief Technologist Bobby Braun. Georgia Tech alumni have had a prominent role in Space Shuttle operations, starting with John Young, commander of STS-1 and Dick Truly, pilot of STS-2. Eric Boe, who piloted Discovery's last flight in May, and Sandy Magnus, who will be a mission specialist on STS-135, Atlantis' final flight and the last flight of the shuttle program, next month, join a dozen other astronauts who are also Georgia Tech alums.

Just this week, we had back to back milestones at the Kennedy Space Center as Endeavour made its final landing and Atlantis rolled out to the

launch pad for the final time, all on the same day – actually the middle of the night!

It's a bittersweet time for us. I've characterized NASA's relationship with the shuttle as a love affair, and I think there's a lot of truth to that. When you have thousands of people completely dedicated to a program, to a fleet of vehicles that have to undergo so much personal attention after they've done such amazing things -- flying millions of miles each mission, building outposts in space, launching and servicing satellites – you get a little attached.

The shuttles are the only vehicles of their type in the world. When you have people who've devoted decades of their careers to the care and feeding of this program, who are completely committed to the safe fly out of that program and the many mission objectives we've accomplished over the years, and you've lost friends and colleagues in the process – well, it's life changing. I hope you can excuse us for being shuttle huggers at the same time as we proudly retire the fleet and help it enter its next phase as stunning educational tools for generations of Americans yet to come.

The future of human spaceflight looks very bright from my vantage point. I've been extremely heartened by the early successes of our industry partners who are developing their own systems for getting cargo, and eventually crew, to the International Space Station (ISS). The safety of that whole process will be our number one priority in the coming years. While we have a lot of work to do to get where we want to be, we've already made great strides with the first commercial launch, orbit, and intact retrieval of a capsule by SpaceX and our continued successful AJ26 engine test firings at the Stennis Space Center for Orbital Sciences Corp. With the second phase of our Commercial Crew Development Program, we recently partnered with four more prospective commercial crew companies to investigate system development which could lead to commercial crew transportation systems in the future. So make no mistake. While we laud and honor the shuttle and also shed some tears, we're very excited about our future as well.

As we move toward a true commercial capability for reaching low Earth orbit, it seems people are yearning even more for routine access to space – one of the unfilled promises of the original space transportation system. With greater commercial access to LEO, we're going to open up an entirely

new segment of the economy and with this will come new high tech jobs. I hope we can all agree – as a nation, we’re ready for that. We know we can do it; in part because of all that we have learned from shuttle, and the fact that we have flown 134 missions to space – more than any other NASA human spaceflight program.

The bi-partisan NASA Authorization Act of 2010 gives the ISS life through at least 2020 and makes it the centerpiece of our human spaceflight activities. The Act directs us to facilitate commercial access to low Earth orbit and develop a Space Launch System (SLS) -- the heavy lift rocket that will carry us on the next generation of missions beyond LEO -- and a multipurpose crew vehicle (MPCV). It puts us on the path to developing many new technologies that will benefit from our deep pool of knowledge from shuttle and help take us to the next level. So tomorrow is already underway.

But it's my honor today to talk to you about a program that was a vital part of my 14-year NASA career. As you no doubt know, I was privileged to fly four times on the space shuttle -- on Columbia, Atlantis and twice on

Discovery. Being an astronaut and serving as a member of the NASA team provided me with some of the proudest moments of my life.

Each shuttle mission has showcased the amazing talents and expertise of our astronauts in robotics and science. Each mission is different. Each is exceptional and challenging. I do believe that with shuttle, we've made it look too easy. The astronauts train for years for each flight, with extra training added for their spacewalks, and as smoothly as our missions have gone, even dealing with the unexpected, we forget how difficult they are.

The shuttle has provided this nation with many firsts, with many proud moments, and it has helped the United States to lead the world in space exploration. I was fortunate enough to be part of two of its historic achievements: the deployment on STS-31 in 1990 of the Hubble Space Telescope, which has redefined our perception of the universe; rewritten textbooks; and inspired a whole new generation of scientists and technology developers; and that first U.S./Russian shuttle mission, STS-60 in 1994 -- which presaged the unprecedented international cooperation we've achieved since on the International Space Station. And of course, the shuttle also made possible all the subsequent servicing missions to

Hubble that extended this unique resource and enhanced this Great Observatory's capabilities.

You could go on for days about the many firsts and historic achievements of the shuttle, which is probably the most amazing machine ever built. The Chandra X-ray Observatory that, among other things, documented the largest supernova ever witnessed, was deployed from a shuttle, as was the Magellan probe to Venus. Many of the Tracking and Data Relay, or TDRS, satellites were deployed from the shuttle. NASA not only uses these satellites to maintain contact with the ISS, but other government agencies use them for satellite communication as well.

We've also deployed communications satellites for many other countries from Shuttle.

The shuttle housed the Space Laboratory (SpaceLab) that helped us learn about microgravity before we built the ISS.

STS 41-C brought us the capture and repair of the Solar Maximum satellite, the first repair of a satellite on orbit. The Solar Max mission studied various

kinds of solar flares, which can be dangerous to astronauts and disrupt communications on Earth.

The Earth Radiation Budget Satellite (ERBS), deployed with the remote manipulator system (RMS) by Sally Ride, the first American woman in space, during STS-41G gave us two decades of information about our planet's ozone layer. Similarly, the Upper Atmosphere Research Satellite (UARS), deployed on STS-48, gave us many more years of service beyond its originally planned mission life.

Shuttle-Mir missions helped solidify our new friendship with the Russians and the shuttle program put a very human face on exploration and discovery. Astronauts have become a diverse group, in every way. The program has been crucial to providing flight opportunities for women and minorities.

Since STS-1, more than 360 individuals in total have flown on the shuttle. Let me remind you that Bob Crippen's flight with John Young on STS-1 was still the only time in history that astronauts were aboard a spacecraft on its first test flight into space. I know a lot of the symposium's panels are going

to discuss the shuttle's history and technical achievements as well as what's next, so I'll leave those speakers to explore those topics for you in more depth.

But you have to remember that the shuttle is still an experimental vehicle, even after 30 years. Even though we know many things about it and we are confident in our procedures and its systems, it is still very much a vehicle from which we continue to learn, that we continue to refine, and from which we will apply many lessons learned to our next space systems.

We have learned technologically, operationally, and on a very human level from this program. We've made many improvements over the life of the program to the vehicle and its propulsion systems and the external tank.

The Challenger and Columbia tragedies taught us very hard lessons that we have applied to make flights safer thereafter.

We've streamlined our orbiter processing, something that will be essential as we anticipate a ramping up of demand for launch services by many parties.



And after 30 years, the shuttle is still an innovative program. It still gives us chances to take what we know and create something new to meet the challenges of space exploration head on and learn from them.

For instance, those satellite-servicing missions required us to innovate in many ways, including development of special tools that didn't exist before.

Shuttle-Mir docking taught us many things we would later apply to rendezvous and docking operations with the ISS.

We updated and improved our orbiter imaging and assessing capabilities, including the rendezvous pitch maneuver, where the shuttle literally flips over so its belly can be viewed and photographed from the station, and also developed the wing leading edge impact sensors, and the orbiter boom observation system for examining the shuttle's thermal protection system in-flight.

And the ISS continues to be a learning experience, not only technically, but also culturally, as we become a space faring people on a global scale.

None of this would have been possible without the shuttle.

We will never forget the sacrifices of our brave crews on Challenger and Columbia. Several were close personal friends whom I shall never forget. But we must also never forget the accomplishments, the joy, the knowledge and the pride this program has brought our country. Human spaceflight survived in great part because of the shuttle program, and we are in a good position today as a result to continue the innovations we started with shuttle and take them to the next level.

The inspiration of those engineers in the 1960s as they first batted about the idea of a blunt-nosed, reusable space vehicle have soared beyond anyone's wildest expectations. It is with great pride that as NASA Administrator, I salute this amazing program, its crews in space and many thousands on the ground, as they enter history and we stand on their shoulders to reach the future.

Thank you.